

# The growth of randomized experiments in policing: the vital few and the salience of mentoring

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## Abstract

**Objectives** The population of randomized experiments in policing is used to examine co-author and mentoring relations in the professional network of scholars and assess if experimental criminology is on the path to creating the necessary social capital to promote the use of randomized controlled trials in criminology and criminal justice research.

**Methods** We use systematic review methods to identify the population of policing experiments. Narrative review and descriptive statistics are used to examine the growth of policing experiments over time. Social network analysis techniques are used to analyze and describe the co-authoring and mentoring connections of the scholars responsible for completing policing experiments.

**Results** We find that the number of policing experiments increased substantially between 1970 and 2011. The growth in policing randomized experiments has been largely generated by a very small number of scholars who account for the bulk of policing experiments and have been very active in mentoring the next generation of experimentalists. Another important factor associated with the rise in policing experiment is the availability of federal funding.

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**Conclusions** Our analysis of policing experiments suggests that the experimental criminology movement is developing the necessary human and social capital to advance the discipline of criminology. However, it is a very small network that could benefit from the addition of new members and increased training and mentoring of graduate students.

**Keywords** Policing · Randomized experiments · Mentoring · Social network

## Introduction

The randomized experiment is generally considered the strongest research design available to evaluate programs and test theories due to its strong internal validity (Shadish et al. 2002; Berk 2005). When implemented properly, randomized experiments provide the clearest assessment of causation. Experimental criminology is a part of a larger and increasingly expanding evidence-based movement in social policy. In general terms, this movement is dedicated to the improvement of society through the utilization of the highest-quality scientific evidence on what works best (see, e.g., Sherman et al. 1997). The evidence-based movement first began in medicine and has, more recently, been embraced by the social sciences. Leading experimental criminologists and organizations, such as the Academy of Experimental Criminology and the Campbell Collaboration's Crime and Justice Group, have been strong advocates for the advancement of evidence-based crime policy and the use of randomized experiments in criminology.

The number of randomized experiments in criminology has grown considerably over the last three decades (Farrington and Welsh 2005; Welsh et al. 2013). Unfortunately, relative to quasi-experiments and observational studies, the overall number of randomized experiments in criminology remains small. Randomized experiments can be labor intensive and require scarce resources such as funding, organizations willing to modify their operations to test programs, and the availability of skilled experimental criminologists. While other elements are clearly important, we believe that social capital, in the form of skilled experimental criminologists and a robust professional network, is a central consideration to the continued growth of randomized experiments in the field. Ensuring the integrity of the execution of randomized experiments under field conditions can be very difficult and implementation problems represent the biggest threat to the internal validity of the design (Sherman 2010; Weisburd and Hinkle 2012). Well-trained and experienced experimental criminologists can ensure design integrity by anticipating and managing implementation problems.

In this paper, we examine the professional network of scholars who have completed randomized controlled trials in policing. We use systematic review methods to identify the population of randomized experiments in policing and social network analysis techniques to describe the relationships among co-authors of existing policing experiments. Mentoring connections among policing experimentalists are also examined to assess the salience of graduate student training in the continued growth of policing experiments. We find that a very small number of tightly networked experimental criminologists are responsible for a large proportion of the growth in

policing randomized experiments between the 1970s and the 2000s. Further, we find that a “vital few” experimental criminologists are also responsible for mentoring the next generation of experimentalists, who have also made substantive contributions to the growth of randomized controlled trials in policing. Implications for the continued expansion of experimental criminology are discussed in the concluding section.

## Randomized experiments in criminology

There are strong theoretical and practical advantages for using randomized experiments to evaluate crime prevention and criminal justice programs (Farrington 1983; Weisburd and Hinkle 2012). The key feature of randomized experiments is that the random assignment equates the experimental and control groups before the experimental intervention on all possible extraneous variables that might influence the outcome (e.g., crime). Hence, any subsequent differences between the groups must be attributable to the intervention. Randomization is the only method of assignment that controls for unknown and unmeasured confounders as well as those that are known and measured (Weisburd et al. 2001). However, the randomized experiment is only the most convincing method of evaluation if it is implemented with full integrity. To the extent that there are implementation problems (e.g., problems of maintaining random assignment, differential attrition, crossover between control and experimental conditions), internal validity could be reduced.

Another important feature of the randomized experiment is that a sufficiently large number of units (e.g., people, areas) need to be randomly assigned to ensure that the treatment group is equivalent to the control group on all extraneous variables (within the limits of statistical fluctuation). In their review of randomized experiments on crime and justice, Farrington and Welsh (2005, 2006) argued for a minimum sample size of 100 units; that is, at least 50 units had to be initially assigned to the experimental and control conditions. However, this is not a hard-and-fast rule, and some research suggests that a smaller  $n$  may not compromise the equivalence of the conditions on extraneous variables (Gill and Weisburd 2013).

Other things being equal, an intervention study in which the experimental and control units are matched or statistically equated (e.g., using a prediction score) prior to intervention—what is called a nonrandomized experiment—has lower internal validity than a randomized experiment. An intervention study with no control group has even less internal validity since it fails to address many threats to internal validity, such as history, maturation, regression to the mean, and testing or instrumentation effects (Cook and Campbell 1979).

### Growth of randomized experiments

The use of randomized experiments in criminology is characterized by an upward trend over the last six decades. In Farrington’s (1983) seminal review on the subject, he identified 37 trials published in English between 1957 and 1981. An additional 85 randomized experiments were published between 1982 and 2004 (Farrington and Welsh 2006). Using a broader set of criteria for inclusion of studies (e.g., no minimum sample size, unpublished reports), Petrosino et al. (2003) identified 267

randomized experiments in criminology carried out between 1945 and 1993. The annual average number of experiments increased sharply from 1.8 in 1961–65 to 9.4 in 1971–75 and 1986–90 to 11.6 in 1991–93. By many accounts, there has been a continued increase in the number of randomized experiments in criminology over the last several years (Welsh et al. 2013; Welsh and Farrington 2012).

A number of methodological advances have contributed to this growth. Between the two periods of 1957–81 and 1982–2004, there was a marked increase in the number of large-scale, multisite replication experiments as well as an increased number of experiments (especially on prevention) with long-term follow-ups. The most noteworthy methodological advance, however, was the increased use of places as the unit of assignment (Farrington and Welsh 2006). This was especially the case in the area of policing, and helped to establish what is now referred to as place-based randomized experiments (Sherman and Weisburd 1995; see also Braga and Weisburd 2010; Weisburd 2005).

Despite this state of affairs, randomized experiments continue to be the exception rather than the rule in evaluating crime prevention and criminal justice programs. One measure of their relative use comes by way of Weisburd et al.'s (2001) analysis of the Maryland report on the effectiveness of criminological interventions (Sherman et al. 1997). Of the 308 studies with offending outcomes that Weisburd et al. (2001) analyzed, only 46 (14.9 %) were classified as randomized experiments. Another indicator of the small fraction of criminological evaluations that employ the experimental method is evident among systematic reviews published by the Campbell Collaboration. For example, only eight out of 154 (5.2 %) evaluations of drug courts (Mitchell et al. 2012) and four out of 32 (12.5 %) evaluations of correctional boot camps (Wilson et al. 2008) used randomized experiments. There are exceptions. In their updated systematic review of hot spots policing, Braga et al. (2012) found that ten out of 19 evaluations (52.6 %) used randomized experiments.

### Key challenges

Part of the critique of randomized experiments—why some view them as the “bronze” standard or worse rather than the “gold” standard of evaluation design (Berk 2005; Sampson 2010)—has to do with the messy nature of conducting them in real-life or field settings. As noted above, randomized experiments are not immune to myriad implementation problems. Take the problem of differential attrition, for example. Researchers are acutely aware, if not obsessive, about the need to avoid the loss of subjects as an evaluation progresses from baseline measurement to intervention to post-intervention follow-ups. This is compounded in the case of randomized experiments because of the added concern with differential attrition, whereby, there is a differential loss of units (e.g., people) from experimental compared to control conditions. Significant differential attrition presents a serious threat to the integrity of the experiment because the benefits of randomization are compromised. Randomizing within matched pairs is one way to avoid the problem of differential attrition.

Many other challenges confront the conduct of randomized experiments, and these may go some way toward explaining why randomized experiments remain relatively underused in criminology. Some of these challenges include: availability of funding;

willingness of organizations to participate and, importantly, for program administrators to relinquish control of the assignment procedures to research staff; legal and ethical considerations; and even the availability of skilled researchers to carry them out.

It is the latter issue that is the starting point for this paper, and one that we view to be especially important for the continued advancement of the experimental method and its contribution to more rational and effective crime policy. For sure, it makes no difference how many skilled (and interested) researchers there are in conducting randomized experiments unless many of the other challenges can be overcome. The good news is that six decades of randomized experiments in criminology show that these challenges can be overcome.

### The availability of skilled experimental criminologists

The advantages of experimental methods in testing theories of crime causation and prevention help to explain why the number of randomized controlled trials has grown considerably over the last three decades (Farrington 1983; Farrington and Welsh 2006). However, these advantages depend on the capability of experimenters to ensure that the necessary elements of an unbiased comparison are achieved. Sherman (2010) observed that many randomized experiments in criminology suffer from flaws that could have been avoided with better planning by the experimenters. He further states:

The lack of such planning, in turn, may be due to the scant attention paid to field experiments in research methods' texts and courses. Even skilled, senior researchers can make basic mistakes when conducting field experiments, since experiments require a very different set of skills and methods than the "normal science" of observational criminology. As in any complex work, the value of 10,000 hours of practice can make an enormous difference in its success... (Sherman 2010: 399).

Experimenters need to be very knowledgeable in the necessary steps and preferred decisions required to plan, conduct, complete, analyze, report, and synthesize high-quality randomized controlled trials (Sherman 2010).

There are, unfortunately, only a small number of experimentalists in the broader field of criminology. Similar to the skewed distributions of income, land ownership, and criminal behavior (commonly known as the Pareto Principle or the "80–20 rule"; see Juran 1951; Sherman et al. 1989a, b), there are a "vital few" criminologists who are responsible for the promotion and use of randomized experiments as an important methodology in crime and justice studies. At present, slightly more than 7 % ( $n=191$ ) of the American Society of Criminology's (ASC) estimated 2,900 members (Miller and Brunson 2011) are also members of its Division of Experimental Criminology (DEC).<sup>1</sup> The DEC membership ranges from graduate students who are learning experimental methods to interested scholars with modest field experience in experimentation to seasoned experimentalists. One important avenue to increase the number of randomized experiments in criminology and criminal justice is to increase

<sup>1</sup> <http://gemini.gmu.edu/cebcp/dec.html>

the number of criminologists who are trained in experimental methods and have experience in implementing randomized experiments in field settings.

The mentoring of graduate students by experienced experimenters is a critical mechanism to increase the number of skilled experimental criminologists available to conduct randomized experiments. Mentors and mentoring can have many meanings and connotations depending on different fields of study and among various authors writing on the subject (e.g., see Brustman 1991). Here, we define a mentor as “a person who leads, guides, and advises someone more junior in experience toward career accomplishments” and mentoring as “the process by which the protégé is guided, taught and influenced” (Anderson and Ramey 1990: 183–184). Mentors develop protégés by teaching graduate students experimental methods in the classroom and involving them in the design and execution of field experiments.

There is some *prima facie* evidence that mentorship matters in generating randomized experimental research. In an empirical analysis of experimenters in the Maryland report, Lum and Yang (2005) found that two-thirds of the researchers who had completed randomized controlled trials had students and colleagues they worked with go on to conduct other randomized experiments. By comparison, less than a third of the researchers who had not conducted randomized experiments had students and colleagues go on to conduct randomized experiments on their own.

The advancement of experimental criminology is dependent on developing and expanding a steady supply of human capital. Thomas Kuhn (1962) noted that the potential for shifting paradigms in science rested, in part, on the ability of a specific scientific sub-community to gather human resources to act as a vanguard for a new way of thinking or doing science. Revolutionary ideas and new theoretical perspectives cannot move forward if converts are not drawn to the cause. Graduate students can be trained to be the “worker bees” in such revolutionary movements (Ballard et al. 2007: 286). Merton (1968) suggests that successful scientists pass along their unique ways of doing science, their knowledge, experience, and expertise to future generations. Summarizing the perspectives of Kuhn and Merton, Ballard et al. (2007) observe that protégés maintain the heritage of methods, systems of thought, and processes of success they were taught during their graduate training. A robust professional network of scholars in a specific sub-community, such as experimental criminology, should be characterized by mentor-protégé connections between generations of scholars. In addition to human capital, experimentalists can leverage *social capital*—the investment they make into their social networks and relationships, and how their placement within key positions in social networks can be used to advance experimental criminology.

### Policing experiments as a unique example

The increase in the absolute number of randomized experiments in criminology over time has been especially pronounced in policing. Between the two periods of 1957–81 and 1982–2004, policing experiments increased from 4 to 12 (Farrington and Welsh 2006). It bears repeating that the latter period represents an undercount of the number of policing experiments, because not all place-based randomized experiments were included. More recent years suggest that this growth in policing experiments has continued. For instance, the Evidence-Based Policing Matrix recently identified 29 policing experiments (Lum et al. 2011b).

This growth is one reason for our focus on analyzing the professional network of experimental criminologists in the area of policing. Another reason is that police officers follow orders regarding how and where to exercise their discretion; the high degree of hierarchical control in police agencies makes it easier to implement randomized experiments (Weisburd and Hinkle 2012). Yet another reason is what appears to be a unique openness and willingness on the part of police leaders across the country—in large and medium-sized cities—to engage the experimental method. Indeed, police leaders have been at the forefront in embracing the need for more experimentation in criminal justice and promoting greater academic-practitioner relationships (Braga and Hinkle 2010). More generally, Petersilia (2008) suggests that policymakers and practitioners today are often willing to support randomized experiments and are more likely to be influenced by experimental findings than in the past.

### Systematic review method and results

Our examination of the growth of randomized experiments in policing used the systematic review protocols and conventions of the Campbell Collaboration (Farrington and Petrosino 2001). Systematic reviews use rigorous methods for locating, appraising, and synthesizing evidence from prior evaluation studies, and they are reported with the same level of detail that characterizes high quality reports of original research. In this study, we used the systematic search methodology to identify the population of randomized policing experiments.

#### Criteria for inclusion and exclusion of studies

Eligible studies had to use a randomized controlled trial research design (Cook and Campbell 1979; Campbell and Stanley 1966). All identified studies were closely screened to ensure that the evaluation, as initially designed and implemented, used a randomized controlled design. Some well-known evaluations described in the policing literature as experiments were excluded because units of analysis were not randomly allocated to treatment and control conditions. For instance, the landmark Kansas City Preventive Patrol Experiment was excluded from this review because the 15 study beats were statistically matched and allocated based on optimal patrol route considerations rather than randomly (Kelling et al. 1974). Conversely, we did include evaluations that were designed and executed as randomized controlled trials but suffered from modest implementation problems that threatened the integrity of the initial design. For example, the Minneapolis Domestic Violence Experiment was designed to randomly assign arrest, separation, and some form of advice which could include mediation at the officer's discretion to misdemeanor domestic assault incidents (Sherman and Berk 1984). Some participating officers failed to follow fully the randomization plan and supplemental analyses were necessary to correct for possible biases introduced by violations of the random assignment.

Eligible studies also had to have treatments that involved police departments in a central programmatic role. It was permissible for treatments to involve additional partners. For instance, restorative justice evaluations that reported police involvement in the face-to-face meetings among crime victims, their offenders, and their respective



families and friends were considered (e.g., Strang et al. 1999). Restorative justice evaluations of court-diversion programs that did not involve the police in the face-to-face meetings were not considered. Finally, to be eligible for this review, treatments had to involve police programs implemented in field settings. Evaluations conducted in laboratory settings, such as a clinical test of less-than-lethal weapons on human stress response (e.g., Dawes et al. 2009), were excluded.

### Search strategies for identification of studies

Several strategies were used to perform an exhaustive search for evaluations meeting the eligibility criteria. First, a keyword search<sup>2</sup> was performed on 17 online abstract databases.<sup>3</sup> Second, the bibliographies of past narrative and empirical reviews of literature that examined evaluations of police programs (Lum et al. 2011a; Sherman 2002; Skogan and Frydl 2004; Weisburd and Eck 2004) and, more generally, the use of experiments in crime and justice (Farrington 1983, 2003; Farrington and Welsh 2005, 2006; Sherman 2009, 2010; Sherman et al. 1997, 2006a, b) were searched. Third, forward searches were performed for works that cited seminal policing experiments (e.g., Sherman and Berk 1984; Sherman and Weisburd 1995; Clayton et al. 1991; Ringwalt et al. 1991; Strang et al. 1999; Sherman et al. 2000; Weisburd and Green 1995). Fourth, bibliographies of past completed Campbell systematic reviews of police interventions were searched (Mazerolle et al. 2007; Weisburd et al. 2008a, b; Bowers et al. 2011; Braga et al. 2012). Fifth, hand searches of leading journals in the field were performed.<sup>4</sup>

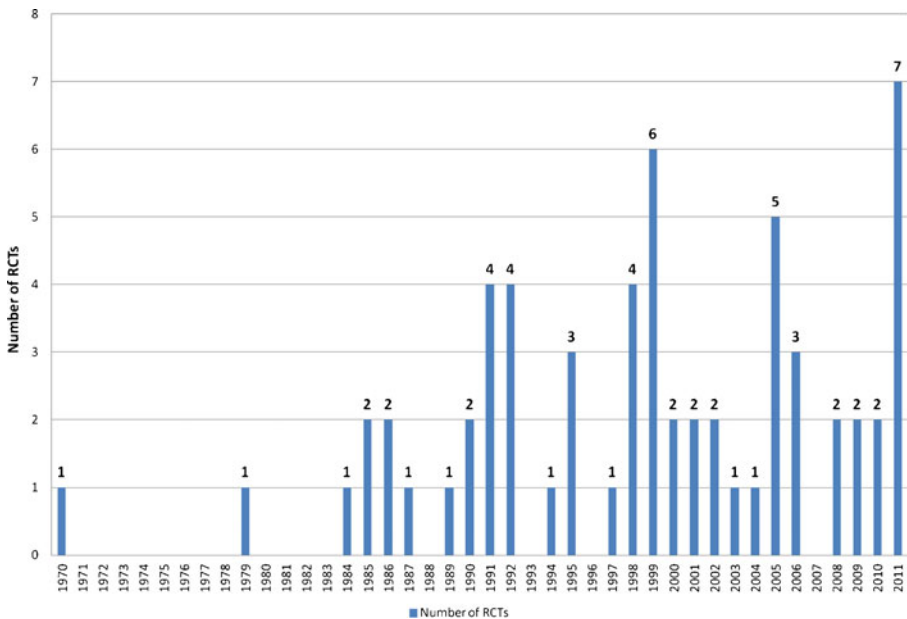
The searches were all completed between January 2012 and May 2012. Thus, the review only covers studies completed in 2011 and earlier. Sixth, after finishing the above searches and reviewing the identified studies, the list of studies meeting our eligibility criteria was emailed to leading criminology and criminal justice scholars knowledgeable in the area of policing experiments. These 129 scholars were defined as those who authored at least one study which appeared on our inclusion list, anyone involved with the National Academy of Sciences review of police research, and other leading scholars (list available upon request from authors). This helped to identify any missing studies. Finally, an information specialist was engaged at the outset of our review and at points

<sup>2</sup> The following three search terms were used: randomized controlled trial AND police, randomized experiment AND police, and experiment AND police.

<sup>3</sup> The following 15 databases were searched: Criminal Justice Periodical Index, Sociological Abstracts, Social Science Abstracts (SocialSciAbs), Social Science Citation Index, Arts and Humanities Search (AHSearch), Criminal Justice Abstracts, National Criminal Justice Reference Service (NCJRS) Abstracts, Educational Resources Information Clearinghouse (ERIC), Legal Resource Index, Dissertation Abstracts, Government Publications Office, Monthly Catalog (GPO Monthly), Google Scholar, Online Computer Library Center (OCLC) SearchFirst, CINCH data search, and C2 SPECTR (The Campbell Collaboration Social, Psychological, Educational and Criminological Trials Register).

<sup>4</sup> These journals were: *Criminology*, *Criminology & Public Policy*, *Justice Quarterly*, *Journal of Research in Crime and Delinquency*, *Journal of Criminal Justice*, *Police Quarterly*, *Policing*, *Police Practice and Research*, *British Journal of Criminology*, *Journal of Quantitative Criminology*, *Crime & Delinquency*, *Journal of Criminal Law and Criminology*, and *Policing and Society*. Hand searches covered 1970–2011.





**Fig. 1** Randomized controlled trials in policing, 1970–2011 (N=63)

along the way in order to ensure that appropriate search strategies were used to identify the studies meeting the criteria of this review.<sup>5</sup>

### Search results

Search strategies in the systematic review process generate a large number of citations and abstracts for potentially relevant studies that must be closely screened to determine whether the studies meet the eligibility criteria (Farrington and Petrosino 2001). The screening process yields a much smaller pool of eligible studies for inclusion in the review. The search strategies produced 16,961 abstracts that included the search terms. The contents of these abstracts were reviewed for any suggestion of a randomized controlled trial of a police program. A total of 355 distinct abstracts were selected for closer review and the full-text reports, journal articles, and books for these abstracts were acquired and carefully assessed to determine whether the study met the eligibility criteria; 54 documents describing 63 eligible studies were identified and included in this review (see separate list in reference section).

Figure 1 presents the yearly counts of the dates that the 63 policing experiments were completed, as determined by key journal publication, final report, or dissertation completion dates. While field work was completed between 1963 and 1965, the first randomized controlled trial in policing was published in the *British Journal of Criminology* in 1970. This evaluation was conducted by University of Manchester

<sup>5</sup> Ms. Phyllis Schultze of the Gottfredson Library at the Rutgers University School of Criminal Justice executed the initial abstract search and was consulted throughout on our search strategies.

researchers and tested a juvenile liaison scheme implemented by the Lancashire County Police Force (Rose and Hamilton 1970). The next policing experiment was not completed until 1979. Byles and Maurice (1979) used a randomized experimental design to test the effects of police and mental health collaborations to address family and personal problems of treated juveniles relative to traditional police arrest responses in Hamilton, Ontario, Canada.

While there were only two policing experiments completed during the 1970s, the pace of experimentation increased during the mid to late 1980s with an additional seven studies completed during the decade. The Minneapolis Domestic Violence Experiment, published in the *American Sociological Review*, was the first policing randomized controlled trial completed in the United States (Sherman and Berk 1984). As Fig. 1 reveals, the number of policing randomized controlled trials increased dramatically post 1990 with a total of 24 randomized experiments completed between 1990 and 1999. Since 2000, a total of 30 policing randomized controlled trials have been completed.

Table 1 presents the basic characteristics of policing randomized controlled trials completed between 1970 and 2011. Nearly 75 % (47 of 63) were completed in the United States. Eleven policing randomized controlled trials were completed in the United Kingdom, four were completed in Australia, and one was completed in Canada. The 63 eligible policing randomized experiments were implemented in 38 different jurisdictions: the cities of London (UK), New York (NY), and Canberra (AUS) were the locations of four experiments each while Jersey City (NJ) and Minneapolis (MN) were the locations of three experiments each. Sherman (2010) has previously noted concentrations of crime and justice field experiments in particular jurisdictions. Drawing on the history of randomized field experiments in medicine and agriculture, Sherman (2010: 409) recognized the need to develop “field stations” where ongoing collaborations between academics and criminal justice practitioners could facilitate the growth of randomized experiments in criminology.

Since many policing experiments were conducted in the US, it is not surprising that US government grant-making agencies and private foundations were the funding sources for the bulk of the eligible studies (Table 1). It is noteworthy that the US National Institute of Justice (NIJ) supported 37 policing randomized controlled trials, or nearly 60 % of the total, between the early 1980s and 2011. In their historical review, Farrington and Welsh (2006) observe that the use of randomized experiments in crime and justice studies goes through periods of “feast and famine.” NIJ deserves much credit for helping to initiate and sustain the increased use of randomized experiments in policing. As Farrington (2003, p. 220) observed, “the tenure of James K. ‘Chips’ Stewart as Director of the National Institute of Justice between 1981 and 1988 ushered in a new golden age of randomized experiments in American criminology.”

More recently, the UK government has supported increased experimentation in England. The UK Home Office has supported a total of nine policing randomized controlled trials, with seven restorative justice randomized experiments completed during the 2000s (Angel 2005; Sherman et al. 2005, 2006a, b). Private foundations are also important sources of support for policing randomized controlled trials. The Jerry Lee Foundation provided support for 11 of the 14 restorative justice experiments identified in this review. The Smith Richardson Foundation has supported five randomized experiments in policing.

**Table 1** Basic characteristics of policing randomized controlled trials 1970–2011,  $n=63$ 

Country	<i>n</i>	Percent
United States	47	74.6
United Kingdom	11	17.5
Australia	4	6.3
Canada	1	1.6
Intervention type	<i>n</i>	Percent
Hot spots/crime places	14	22.2
Restorative justice	14	22.2
Domestic/family violence	13	20.6
Drug abuse resistance education	6	9.5
Juvenile interventions	4	6.3
Stranger repeat offender apprehension	2	3.2
Fear reduction	2	3.2
Crime victim outreach	2	3.2
Citizen feedback on services/information	2	3.2
DNA crime solving	1	1.6
TASER use	1	1.6
Shift length hours	1	1.6
Eyewitness identification	1	1.6
Funding source <sup>a</sup>	<i>n</i>	Percent
US National Institute of Justice	37	58.7
Jerry Lee Foundation	11	17.4
UK Home Office	9	14.3
Smith Richardson Foundation	5	7.9
AUS Criminology Research Council	4	6.3
US National Institute on Drug Abuse	4	6.3
US National Institute of Mental Health	2	3.2
US Office of Juv. Justice & Delinquency Prev.	2	3.2
US Bureau of Justice Assistance	2	3.2
Robert Wood Johnson Foundation	2	3.2
US Community Oriented Policing Services	1	1.6
Ford Foundation	1	1.6
Canadian Health & Welfare Department	1	1.6
North Carolina Department of Education	1	1.6
Open Society Foundations	1	1.6
JEHT Foundation	1	1.6
Lily Endowment	1	1.6
Donner Foundation	1	1.6
Esmée Fairbairn Foundation	1	1.6
Laura and John Arnold Foundation	1	1.6
No funding source identified	4	6.3

<sup>a</sup>These categories are not mutually exclusive as some experiments were supported through grants from multiple funding sources

The results of our systematic review show the concentration of randomized controlled experiments in a small number of police policy areas. More than three-fourths of policing

randomized controlled trials have involved tests of hot spots/place-based policing strategies (14, 22.2 %), restorative justice schemes (14, 22.2 %), domestic/family violence interventions (13, 20.6 %), and drug abuse resistance education (six, 9.5 %). As detailed in Table 1, randomized controlled trials have also been used to evaluate a variety of other policing interventions such as juvenile delinquency reduction, stranger repeat offender apprehension, fear reduction, crime victim outreach, and citizen feedback on police service programs.

Replications of highly influential experiments clearly contributed to the growth of policing randomized controlled trials during the study time period. For instance, the NIJ-supported Minneapolis Domestic Violence Experiment revealed that mandatory arrest for misdemeanor offenses worked best: it significantly reduced repeat offenses relative to mediation and separation approaches (Sherman and Berk 1984). The results of the experiment were very influential as many police departments adopted mandatory misdemeanor arrest policies and a number of states adopted mandatory misdemeanor arrest and prosecution laws (Sherman 1992). With funding from NIJ, randomized controlled trial replications in five US cities—Charlotte (Hirschel et al. 1992), Colorado Springs (Berk et al. 1992), Omaha (Dunford et al. 1990), Milwaukee (Sherman et al. 1991), and Miami-Dade County (Pate and Hamilton 1992)—soon followed.<sup>6</sup> Subsequently, randomized controlled trials seemed to become a common design in the evaluation of police-led programs to address domestic/family violence problems. Beyond Minneapolis and its replications, our systematic review identified another seven randomized field experiments in this police policy area.

Similarly, two influential randomized controlled experiments in Minneapolis initiated during the late 1980s—Repeat Call Address Policing (Sherman et al. 1989a, b) and Hot Spots Patrol (Sherman and Weisburd 1995)—led to the development of additional hot spots/place-based policing randomized experiments (Braga and Weisburd 2010). These 12 subsequent hot spots/place-based policing experiments examined the impacts of varying intervention strategies (e.g., increased traditional enforcement, problem-oriented policing, place managers, and disorder policing), the efficacy of these approaches in different types of crime hot spots (e.g., general crime hot spots, violent crime hot spots, and drug markets), and whether these interventions generate spatial crime displacement or diffusion of crime control benefits effects (see Braga et al. 2012).

A long-term research program has been explicitly managed to examine the impacts of restorative justice programs on a range of violent, property, and drunk-driving offenders in varying settings through a series of replications. Led by researchers at the University of Pennsylvania, University of Cambridge, and Australian National University, the Jerry Lee Program on Randomized Controlled Experiments in Restorative Justice has completed 11 randomized controlled trials of police-involved restorative justice programs in Australia and the UK between 1995 and 2006 (for a review, see

<sup>6</sup> The replications of the Minneapolis Domestic Violence Experiment in five other cities did not produce the same findings. In his review of those differing findings, Sherman (1992, p.19) identified four policy dilemmas for policing domestic violence: (1) arrest reduces domestic violence in some cities but increases it in others, (2) arrest reduces domestic violence among employed people but increases it among unemployed people, (3) arrest reduces domestic violence in the short run but can increase it in the long run, and (4) police can predict which couples are most likely to suffer future violence, but our society values privacy too highly to encourage preventive action.

**Table 2** Lead authors with more than one policing randomized controlled trial

	Lead author	Total RCTs	Collaborators ( <i>n</i> )	Mean per RCT
Lawrence Sherman	10	17	22	3.1
Heather Strang	4	9	6	3.7
Robert C. Davis	4	5	5	1.4
David Weisburd	3	7	15	2.6
Anthony Pate	3	3	5	3.0
Lorraine Green Mazerolle	2	4	8	2.5
Caroline Angel	2	4	6	1.5
Bruce Taylor	2	3	4	1.7
Anthony Braga	2	2	6	3.0
Franklyn Dunford	2	2	2	1.0
Paul McCold	2	2	1	1.0

Sherman and Strang 2007).<sup>7</sup> In addition to the growing number of Jerry Lee-sponsored randomized experiments in this area, two police-led restorative justice randomized experiments have been completed in Bethlehem (PA) (McCold and Wachtel 1998) and one has been completed in Indianapolis (IN) (McGarrell et al. 2000).

The published and unpublished reports for the 63 randomized policing experiments were authored by a total of 126 distinct individuals. However, a cursory review of the author list reveals that a few scholars were responsible for a bulk of the policing experiments. Further, these “multi-experiment” scholars tended to collaborate with a number of others on their experiments. Table 2 presents a list of 11 scholars who were the first authors of more than one randomized policing experiment. These 11 scholars led 36 randomized policing experiments (57.1 % of 63) and were authors (lead or otherwise) of 39 randomized policing experiments (61.9 % of 63). Lawrence Sherman was the most prolific experimenter in this group. He was the lead author of 10 policing experiments (15.8 % of 63) and was an author (lead or otherwise) of 17 policing experiments (26.9 % of 63). Sherman collaborated with a total of 22 other individuals on these 17 randomized experiments and averaged 3.1 collaborators per publication.

Many of these 11 scholars collaborated with others identified in Table 2. For instance, Sherman most frequently collaborated with Heather Strang, as they jointly worked on 9 restorative justice experiments together. Sherman also worked with David Weisburd (one experiment), Anthony Pate (two experiments), and Caroline Angel (two experiments)—who was his graduate student at the University of Pennsylvania. Robert C. Davis collaborated with David Weisburd on one experiment and Bruce Taylor on two experiments. David Weisburd collaborated with Sherman, Davis, Lorraine Green Mazerolle (one experiment), and Anthony Braga (one experiment). Among the ten

<sup>7</sup> The UK restorative justice randomized controlled trials were designed and implemented by Lawrence Sherman and Heather Strang. However, it is important to note here that Shapland et al. (2008) were assigned by the UK Home Office as independent evaluators to measure the results of the experiments. Given their seminal role in the development and execution of these studies, we credited Sherman and Strang reports and publications as the primary references for these randomized experiments.

other scholars in Table 2, Green Mazerolle, Braga, and Bruce Taylor were graduate students of Weisburd when he was a professor at the Rutgers School of Criminal Justice.

At face value, this simple look at the most frequent lead authors of randomized policing experiments suggests that the professional network of scholars involved in these studies can be characterized by a small number of central players who are densely connected to others in the network. It also shows that some repeat experimenters were involved in randomized policing experiments as graduate students or were taught experimental methods in graduate school by leading police experimenters. We formally investigated the centrality of individual scholars and the importance of mentoring connections within the full network by using social network analysis.

### Social network analysis

The importance of social relations in understanding human behavior is the focus of social network analysis (Scott 2000) and has witnessed an increase in criminology over past decade (McGloin and Kirk 2010; Papachristos 2011). We used social network analysis techniques to describe the professional network of  $n=126$  scholars who completed randomized experiments in policing and to understand how mentoring and collaborative relationships connect these scholars across policing experiments. We also investigated how certain cliques of scholars and their protégés have contributed to the growth of policing experiments between 1970 and 2011. We used R and igraph software to create sociograms of co-author and mentoring social networks and to estimate network measures to describe the properties of these networks (R Core Team 2012; Csardi and Nepusz 2006).

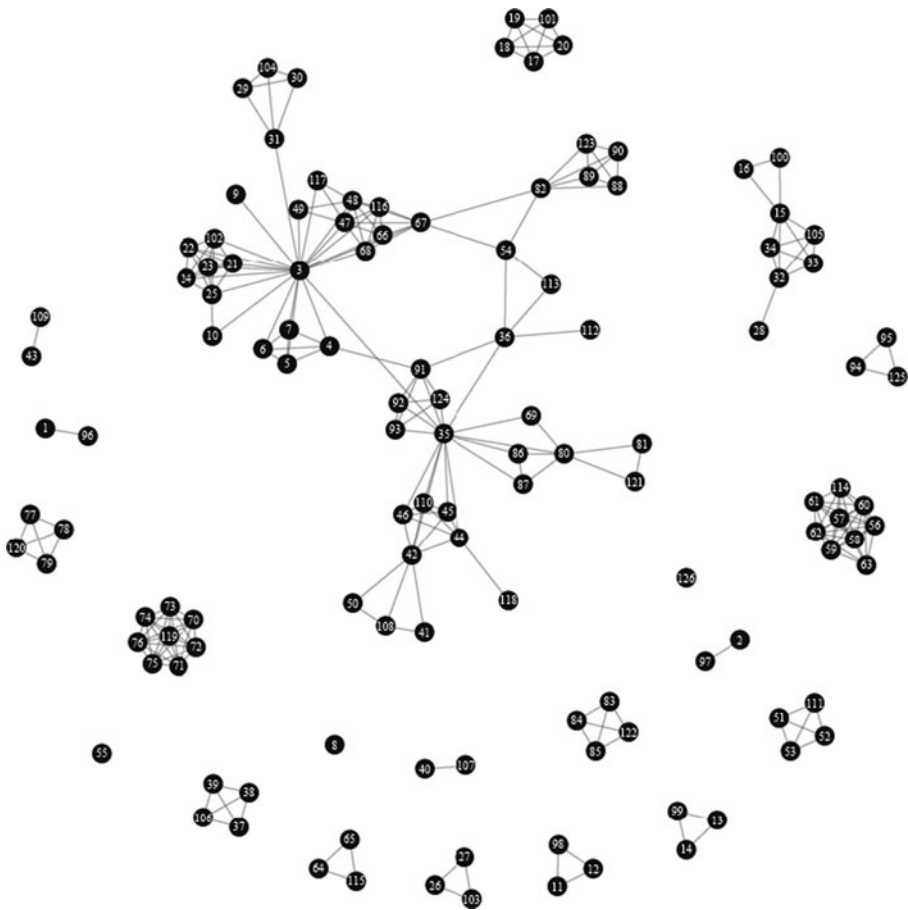
Following graph theory, social network data have two relevant units of analysis: the scholars (or “nodes”) and the relationships among them (or “ties”). A graph or social network is thus defined formally as a set of nodes and the ties among them (Wasserman and Faust 1994). Ties between scholars were defined in two ways. First, scholars were connected when they had co-authored the main report of a policing randomized controlled trial. For instance, the Minneapolis Domestic Violence Experiment connected Sherman and Berk (1984) as co-authors. Second, we also connected scholars based on evidence of a previous mentoring relationship. The Colorado Springs replication experiment connected Berk et al. (1992) as co-authors and also connected Berk as a mentor to Campbell, Western, and Klap, who were his graduate students at the time the experiment was completed. Mentor—protégé relationships were determined by reading biographical sketches of authors on policing experiment reports, reviewing curriculum vitae of study authors to determine whether they had been trained by senior experimenters as graduate students, and through direct communications (via email, phone, and face-to-face conversation) with study authors. These data were used to create three socio-matrices of relationships: a co-author matrix, a mentoring matrix, and a combined co-author/mentoring matrix. Table 3 provides the individual scholar associated with each numbered node in all sociograms discussed here.

Figure 2 presents the sociogram of the co-authorship relationship matrix. This sociogram is characterized by one large component of 54 scholars (42.8 % of the 126 scholars), 13 smaller components ranging in size from 3–9 scholars, four dyads, and

**Table 3** Scholars in policing randomized experiments networks

1. GORDON ROSE	43. JOHN ECK	85. TRAVIS TANIGUCHI
2. J. A. BYLES	44. ANTHONY BRAGA	86. CHRISTINE FAMEGA
3. LAWRENCE SHERMAN	45. ELIN WARING	87. JOSHUA HINKLE
4. ANTHONY PATE	46. WILLIAM SPELMAN	88. BREANNE CAVE
5. PAUL LAVRAKAS	47. HEATHER STRANG	89. CYNTHIA LUM
6. MARY ANN WYCOFF	48. GEOFFREY BARNES	90. JULIE HIBDON
7. WESLEY SKOGAN	49. JOHN BRAITHWAITE	91. EDWIN HAMILTON
8. MALCOLM KLEIN	50. JAMES PRICE	92. GREG JONES
9. SUSAN MARTIN	51. EDMUND MCGARRELL	93. KAREN AMENDOLA
10. MICHAEL BUERGER	52. KATHLEEN OLIVARES	94. GARY WELLS
11. FRANKLYN DUNFORD	53. KAY CRAWFORD	95. NANCY STEBLAY
12. DAVID HUIZINGA	54. BRUCE TAYLOR	96. R.A. HAMILTON
13. RICHARD CLAYTON	55. MATTHEW GIBLIN	97. A. MAURICE
14. ANNE CATTARELLO	56. CHERYL PERRY	98. DELBERT ELLIOTT
15. CHRISTOPHER RINGWALT	57. KAREN MUNSON	99. KATHERINE WALDEN
16. SUSAN ENNETT	58. KELLI KOMRO	100. KATHLEEN HOLT
17. ALLAN ABRAHAMSE	59. KIAN FARBAKHSH	101. THOMAS KOSIN
18. PATRICIA EBENER	60. LINDA BOSMA	102. ANTHONY BACICH
19. PETER GREENWOOD	61. MELLISA STIGLER	103. CHARLES DEAN
20. NORA FITZGERALD	62. SARA VEBLEN-MORTENSON	104. RUTH KLAP
21. DEAN COLLINS	63. MELISSA STIGLER	105. DEANNA WILKINSON
22. DENNIS ROGAN	64. JULIE HORNEY	106. SHARON FRIEDMAN
23. ELLEN COHN	65. WILLIAM WELLS	107. BENJAMIN WATCHEL
24. JANELLE SCHMIDT	66. CAROLINE ANGEL	108. JAN ROEHL
25. PATRICK GARTIN	67. DANIEL WOODS	109. JULIE WARTELL
26. DAVID HIRSCHTEL	68. SARAH BENNETT	110. FRANK GAJEWSKI
27. IRA HUTCHINSON	69. NANCY MORRIS	111. NATALIE KROOVAND
28. ARTHUR LURIGIO	70. ZILI SLOBODA	112. JUANJO MEDINA-ARIZA
29. ALEC CAMPBELL	71. RICHARD STEPHENS	113. CHRISTOPHER MAXWELL
30. BRUCE WESTERN	72. PEGGY STEPHENS	114. LESLIE LYTLE
31. RICHARD BERK	73. SCOTT GREY	115. EDWARD MAGUIRE
32. DENNIS ROSENBAUM	74. BRENT TEASDALE	116. NOVA INKPEN
33. ROBERT FLEWELLING	75. RICHARD HAWTHORNE	117. DOROTHY NEWBURY-BIRCH
34. SUSAN BAILEY	76. JOSEPH WILLIAMS	118. BRENDA BOND
35. DAVID WEISBURD	77. AARON CHAFLIN	119. JESSE MARQUETTE
36. ROBERT DAVIS	78. JOHN ROMAN	120. CARLY KNIGHT
37. ANNETTE JOLIN	79. SHANNON REID	121. MICHAEL AULT
38. ROBERT FOUNTAIN	80. JUSTIN READY	122. JENNIFER WOOD
39. WILLIAM FEYERHERM	81. WILLIAM SOUSA	123. LINDA MEROLA
40. PAUL MCCOLD	82. CHRISTOPHER KOPER	124. MEGHAN SLIPKA
41. COLLEEN KADLECK	83. ELIZABETH GROFF	125. JENNIFER DYSART
42. LORRAINE GREEN-MAZEROLLE	84. JERRY RATCLIFFE	126. PAUL QUINTON

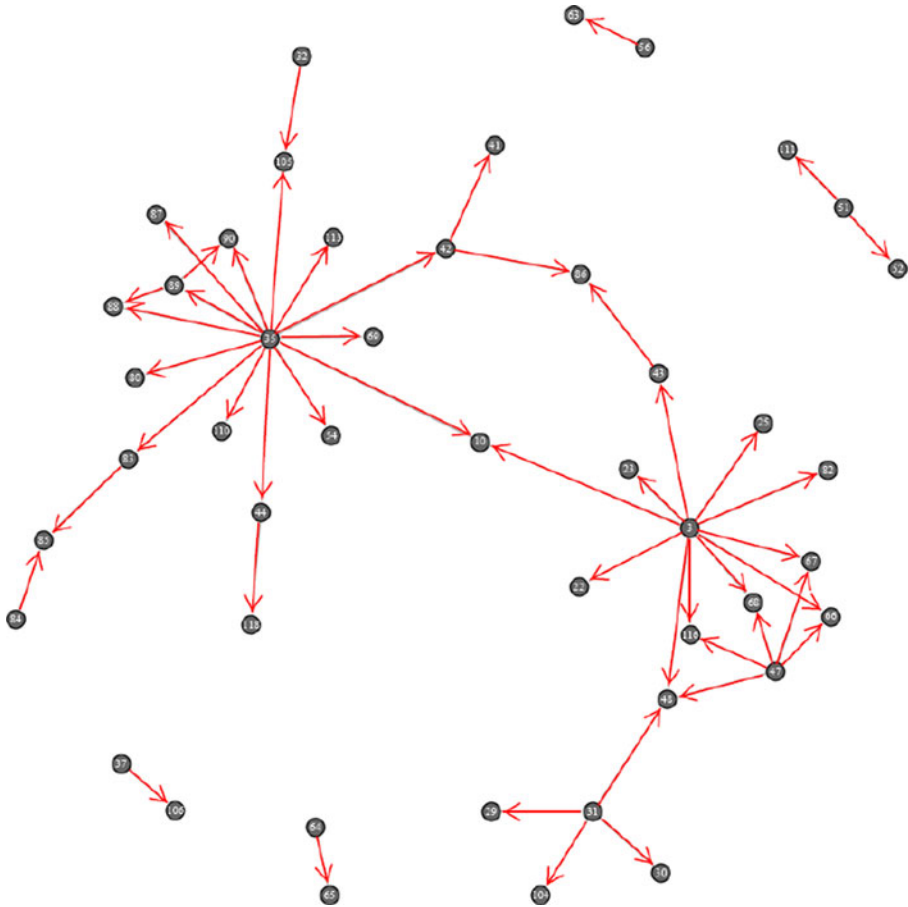




**Fig. 2** The social network of co-authors in policing randomized experiments

three isolates (Klein—node eight, Giblin—node 55, Quinton—node 126). The scholars in the large clique are responsible for the completion of 38 randomized controlled trials in policing (60.3 % of the 63 RCTs). The geodesic is the shortest distance between two nodes (Wasserman and Faust 1994). The largest component has an average geodesic of 3.3. As such, nearly two-thirds of the policing randomized experiments were completed in a single connected network where people are, on average, only three handshakes away from each other. Certain scholars in this large component are connected to high numbers of other scholars. As mentioned earlier, Sherman (node 3) has co-authored with 22 other scholars, Weisburd (node 35) co-authored with 15 other scholars, and Green Mazerolle (node 42) co-authored with eight other scholars.

Figure 3 presents the sociogram of the mentoring network with the isolates excluded. Out of the 126 scholars comprising the co-author network, 46 scholars (36.5 %) were connected either directly or indirectly through a mentoring relationship. There were 36 randomized policing experiments (57.1 % of 63 RCTs) that included a graduate student on the final report or were completed by a scholar who was previously mentored by a



**Fig. 3** The social network of mentors and protégés in policing randomized experiments

senior experimentalist. The arrows represent a directional relationship that emanates from the mentor to the protégé. The mentoring sociogram is characterized by one large component of 37 scholars, one triad, and three dyads. The large clique is anchored by two highly central nodes—Weisburd and Sherman. Interestingly, both of these highly influential experimental criminologists were mentored by Albert J. Reiss, Jr. when they were doctoral students in sociology at Yale University. In this regard, Reiss could be considered the “godfather” of randomized experiments in policing.

Weisburd (node 35) has mentored 14 other scholars in this component. Weisburd coauthored policing experiments with eight of his graduate students and trained another six graduate students who went on to execute policing experiments on their own. It is also important to note that four of Weisburd’s protégés have, in turn, mentored graduate students who were involved in the completion of a policing randomized controlled trial. These scholars include Green Mazerolle (node 42), Braga (node 44), Groff (node 83), and Lum (node 89). For instance, Lum completed a randomized policing experiment with Hibdon (node 90) and Cave (node 88) who also received training from Weisburd in

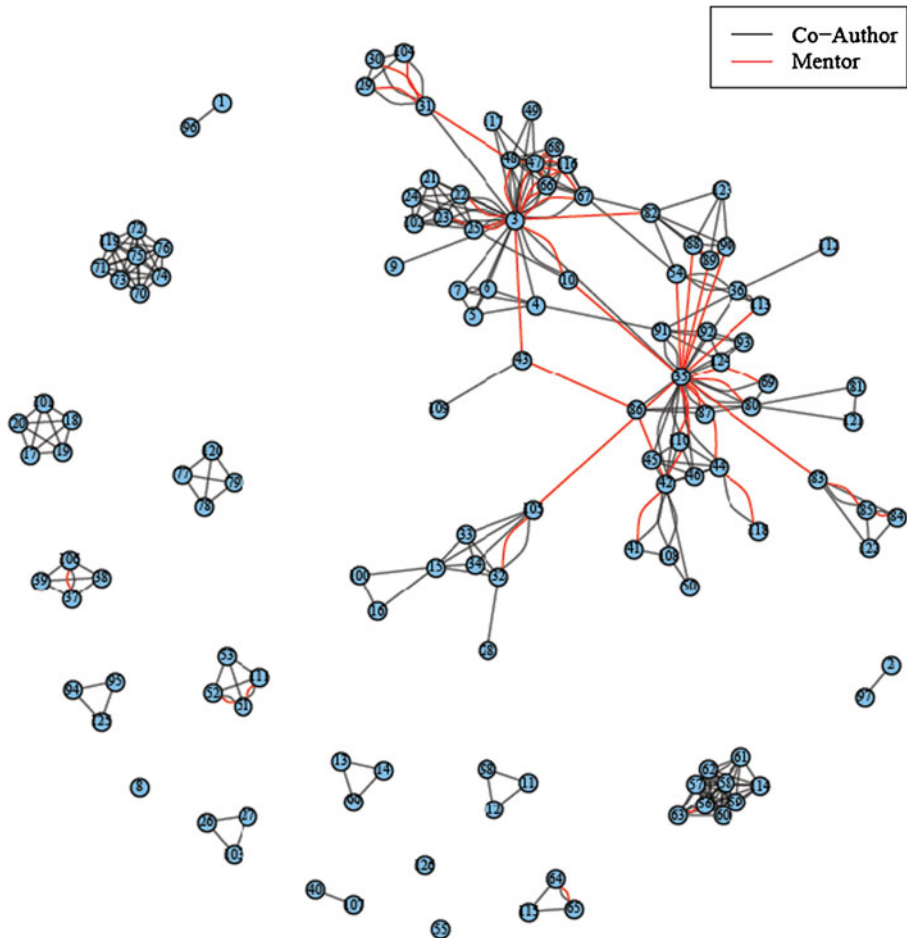
experimental methods at George Mason University. Weisburd, Lum, Hibdon, and Cave worked as staff at the Center for Evidence Based Crime Policy, a research center that promotes the use of randomized experiments in criminal justice policy evaluation. Wilkinson (node 105) received training from Weisburd while a doctoral student at Rutgers but completed a randomized experiment with Rosenbaum (node 32) while she was a masters student at the University of Illinois, Chicago.

Sherman (node 3) has mentored 10 other scholars in this clique. Five of his protégés were jointly mentored by Strang (node 47) as part of their randomized experiments in restorative justice policing in Australia and the UK. Geoffrey Barnes (node 48) received training from and worked on randomized experiments as a graduate student with Sherman, Strang, and Berk (node 31). As of 2011, only one of Sherman's protégés had subsequently mentored graduate students who have been involved in the completion of a randomized policing experiment. John Eck (node 43) was a senior scholar with many years of research experience when he completed his PhD under Sherman's supervision at the University of Maryland in 1994. While pursuing her PhD at the University of Cincinnati, Famega (node 86) studied under Eck and Green Mazerolle (node 42) and published articles with both. Famega later conducted a randomized controlled trial evaluating the efficacy of broken windows policing at crime hot spots with Weisburd (node 35).

We also examined the number of randomized controlled trials completed during the study time period by mentored scholars after the completion of their PhD degrees and without the direct involvement of their mentors. This search included randomized controlled trials evaluating interventions in other criminal justice policy areas.<sup>8</sup> We found that 12 mentored scholars went on to be involved in the production of 23 additional randomized controlled trials. Thirteen of these randomized experiments were in the policing field and are included in this study; six involved randomized controlled trials in other criminal justice policy areas. Some of these mentored scholars were involved in multiple randomized controlled trials. For instance, Bruce Taylor (node 54) was involved in ten randomized experiments and Christopher Maxwell (node 113) was involved in three randomized experiments. Anthony Braga (node 44), Lorraine Green Mazerolle (node 42), Elizabeth Groff (node 83), and Christopher Koper (node 82) were involved in two randomized experiments, each post-completion of their PhD degrees and independent of their mentors.

Figure 4 presents the sociogram of the combined co-author and mentoring networks. This sociogram is characterized by one large component of 68 scholars (54.0 % of the 126 scholars), 11 smaller components ranging in size from 3–9 scholars, three dyads, and three isolates. The largest component accounted for 43 randomized policing experiments between 1970 and 2011 (68.3 % of 63 RCTs). More importantly, this component dominated the growth in policing randomized experiments during the study time period with zero RCTs in the 1970s (0 % of two completed that decade), six in the 1980s (85.7 % of seven completed that decade), 17 in the 1990s (70.8 % of 24 completed that decade), and 20 in the 2000s (66.7 % of the

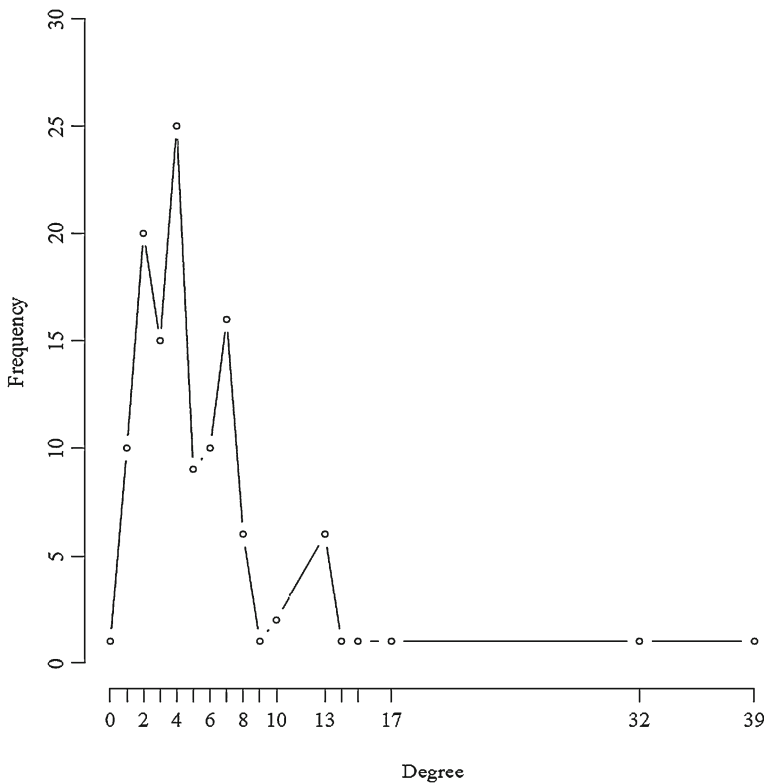
<sup>8</sup> This supplemental search was completed by taking each mentored scholar's name and replicating the abstract search procedures described earlier in the systematic review methods section. For example, we combined "Justin Ready" with "randomized controlled trial", "randomized experiment", and "experiment" and searched for these keyword terms in the 15 online abstract databases. Abstracts were screened and potentially eligible studies were obtained and reviewed.



**Fig. 4** Combined social network in policing randomized experiments

30 completed that decade plus 2011). The number of policing experiments involving protégés mentored by senior experimenters also grew from one randomized experiment in the 1980s to 13 randomized experiments in the 1990s to 20 randomized experiments in the 2000s (plus 2011).

Consistent with the separate co-author and mentoring networks, the combined network can be characterized as anchored by a small number of highly central scholars. Visually, this can be seen in Fig. 4, where these highly central actors are at the center of small clusters within the network—for example, Weisburd (node 25) connects small clusters of scholars through ties with Buerger (10), Groff (83), Wilkinson (node 105), and others. Figure 5 presents the distribution of the number of network ties or “degrees” for the 126 scholars that comprise the entire policing experiment network; degrees are considered measures of activity (in this case, co-authoring and mentoring). The mean number of degrees per scholar in the network was 5.4 with a standard deviation of 5.1 degree. However, the distribution is skewed to the right with a quarter of the scholars having a small number of degrees (31



**Fig. 5** The distribution of ties in combined network

scholars, 24.8 % of 125, had two or fewer ties) and two scholars with 32 and 39 degree (Weisburd and Sherman, respectively). The right-skewed distribution of network ties is typical of other types of social networks (Scott 2000). For instance, Papachristos et al. (2012) examined the ties among Boston gang members and found that many gang members had a small number of ties to other individuals and a few had a very large number of ties across the gang network.

The number of ties is a very basic measure of centrality within a network. A finer grained measure of centrality within a network examines the “betweenness” of particular nodes (Freeman 1979: 237). As mentioned earlier, the geodesic distance refers to the shortest path between two nodes (Knoke and Kuklinski 1982), where the distance between two nodes  $n_i$  and  $n_j$  is measured simply as  $d(i, j)$ . “Betweenness centrality” is a measure of a node’s centrality in a network equal to the number of shortest paths from all vertices to all others that pass through that node (Freeman 1977). In other words, a node with a high betweenness centrality lies on a greater number of shortest paths—he or she is literally “between” a greater number of nodes. Betweenness centrality measures the “brokerage” of particular nodes within a network and quantifies the flow of communication through particular actors. In the policing experiment network, it provides a measure of the extent that any individual scholar is in the middle of—and perhaps brokers—influence, ideas, and resources within then network.

**Table 4** Betweenness centrality: top five scholars in policing randomized experiments network

Rank/scholar	Normalized betweenness
1. David Weisburd	0.2002
2. Lawrence Sherman	0.1554
3. Lorraine Green Mazerolle	0.0252
4. Richard Berk	0.0251
5. Elizabeth Groff	0.0250

Table 4 presents the top five scholars in the policing randomized experiment network according to the normalized betweenness centrality measure. We normalized the measure for ease of interpretation; values range from 0 to 1 with higher numbers indicating greater centrality relative to other network members (Knoke and Kuklinski 1982). The absolute value of the measure is less important than the relative value. Not surprisingly, Weisburd (0.2002) and Sherman (0.1554), respectively, are the two most central members of the network when paths between other nodes are considered. Indeed, no other scholar in the network comes close to Weisburd and Sherman as a hub of connections to other scholars. The difference between the top two scholars and the third and fourth ranked scholars (Green Mazerolle, 0.0252; Berk, 0.0251) is very large. The magnitude of Weisburd's normalized betweenness centrality is 8 times larger than the normalized betweenness centrality of Green Mazerolle and Berk; by this same measure, Sherman's score is 6.2 times larger than the scores of Green Mazerolle and Berk. This comparison is not intended to take away from the important contributions of Green Mazerolle, Berk, or any of the other scholars in the network. Rather, it demonstrates the vital importance of two very central scholars in advancing experimentation in the policing field.

## Discussion and conclusions

The number of randomized experiments in policing increased dramatically between 1970 and 2011. This growth was especially pronounced in the 1990s and 2000s, which included the completion of 54 policing experiments (85.7 % of the population of 63 RCTs). The major growth areas of experimental inquiry have included crime hot spots, restorative justice, domestic/family violence, and drug abuse resistance education. The growth of police experiments in these areas and other policing areas can be characterized as relying on support from public funding agencies, such as the U.S. National Institute of Justice, and private funding agencies such as the Jerry Lee Foundation. These experiments also required willing host criminal justice organizations with some agencies serving as the sites for multiple randomized experiments.

One of the most striking aspects of the growth in policing randomized experiments is the small number of scholars who carried out the work; that is, rather than grown by spreading to a large number of adaptors, randomized experiments grew by the productivity of a small and highly active connected network of collaborators and students. The professional network is dominated by a vital few experimentalists who account for the bulk of policing experiments and have been very active in mentoring the next generation

of experimental policing scholars. For instance, during the study time period, Lawrence Sherman and David Weisburd have been involved in the completion of a combined 23 policing randomized experiments (36.5 % of 63 RCTs) and have mentored a cadre of young scholars who have gone on to complete additional randomized experiments. Indeed, without Sherman, Weisburd, and a handful of other committed scholars, there would be very few randomized experiments in policing (and the observed network would essentially fall apart).

Our investigation of one area of experimental criminology (policing) suggests that the area of experimental criminology is beginning to gather the necessary human resources—through the mentoring of graduate students in experimental methods—to potentially shift scientific paradigms in mainstream criminology towards increased experimentation. The potential for change seems great as this human capital is layered on the social capital observed in the observed policing network. It is also important, however, to note that the pool of experimental criminologists is very small. While there are non-DEC-member scholars who use randomized experiments in their crime and justice research agenda, slightly more than 7 % of ASC members also participate in its DEC. Relative to the broader ASC membership, the professional network of scholars who have completed policing randomized experiments can be characterized as a “small-world” network (see Watts 1999; Watts and Strogatz 1998).<sup>9</sup> In other words, this network contains densely connected pockets of activity with several individuals (e.g., Sherman and Weisburd) who expand outward from these clusterings. The challenge to experimental criminologists is to ensure that their small world enhances its connections to mainstream criminology and other related social science fields.

We believe the best way to increase the number of experimental criminology converts is to increase the number of graduate students who are involved in randomized experiments and trained in the classroom by seasoned experimentalists. As suggested by Kuhn (1962) and Merton (1968), criminology and criminal justice graduate students represent the next generation of experimental scholars who will maintain the heritage of methods, systems of thought, and processes of success currently being maintained by the vital few. Graduate students are critically important to the continued proliferation of randomized experiments in criminology and to increasing the share of ASC members who use experimental methods in their research agendas. The DEC currently seeks to stimulate graduate student interest through e-mail mentoring programs, student paper awards, and young experimental scholar awards (for recent PhD graduates who exhibit great promise).

The vital few experimental criminologists can also increase their numbers by encouraging the “useful many” (Juran 1951) criminologists who do not currently use the method in their research to add randomized experiments as an important part of their methodological tool kit. There are many ways experimental criminologists have attempted to achieve this goal. To increase interest in randomized experiments, experimental criminologists have written persuasively in popular journals and edited volumes that randomized experiments enhance scientific quality, evidence-based policy, causal inference, and liberty (Farrington 2003; Sherman 2009, 2010; Weisburd 2003). DEC

<sup>9</sup> In fact, the observed degree distribution in Figure 5 is one of the key properties of formal small-world graphs; the other two properties being a graph’s clustering coefficient (C) and average path length (L). Also, consistent with the properties of small-world graphs, initial tests suggest that the total network in Fig. 4 has a high clustering coefficient (C=0.606) and a short average path length (L=2.91).



also holds workshops on experimental methods and hosts a series of professional networking events at the annual ASC conference; non-DEC-members can sign up for the workshops and attend these events.

Also important, experimental criminologists can collaborate with other scholars in the development and execution of randomized controlled trials. For instance, beginning in 2008, Philip J. Cook, a well-respected economist with no previous background in randomized experiments, partnered with Jens Ludwig and Anthony Braga, two experienced experimenters, on his first randomized controlled trial evaluating a prisoner reentry program operating in Milwaukee, Wisconsin (Cook et al. 2012). Cook is now involved with several additional randomized experiments in Chicago and was recently elected a Fellow of the Academy of Experimental Criminology.

Despite the relatively small number of scholars completing randomized controlled trials, experimental criminology seems to be on an upward trajectory within the broader field of criminology. Indeed, the proliferation of randomized experiments over the last three decades (Farrington and Welsh 2006; Welsh et al. 2013) confirms that an increasing number of criminologists recognize the advantages of the design in testing theories and criminal justice policy interventions. Our social network analysis of randomized experiments in policing reveals a dynamic network of highly productive academics who are training and mentoring new scholars in experimental methods. In turn, these new scholars are conducting randomized experiments independent of their mentors. These are necessary conditions to create a more central role for experimentation in criminology. The future looks bright for experimental criminology.

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